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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DUONG, THANH P

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 03/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/087,981

Applicant(s)

NOUGIER ET AL.

Examiner

Tom P. Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 21-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicants' remarks and amendments filed on December 16, 2005 have been carefully considered. Claims 1-12 have been amended. New claims 17-23 have been added. Claims 1-23 are pending in this application.

Election/Restrictions

Newly submitted claims 17-20 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The reactor device as claimed can be used in steam reforming process other than in thermal cracking reaction and/or thermal pyrolysis.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 17-20 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3, 10, 13-16, and 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Busson et al. (5,554,347) or Alagy et al. (5,270,016). Regarding claims

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1, 3, 10, and 21-22, Busson and Alagy disclose a reactor device (Fig. 1B, and Fig. 1C) for carrying out chemical reactions requiring heat exchange (3), said reactor, which is elongate along an axis, having, at a first end (inlet), at least one means (5) for supplying at least one reactant and, at an opposite end, at least one means (10) for evacuating the effluents formed, and having a plurality of heat exchange means (3) separated by at least one internal partition (11,22) participating in controlling the residence time (Col. 11, lines 42-45) of the reactant or reactants and increasing the heat exchange surface inside the reactor (Col. 10, lines 63-67 and Col. 11, lines 1-5), and passages for circulating the reactant or reactants and/or effluents (distance Ee), provided between said heat exchange means and said internal partitions (Col. 11, lines 48-52), characterized in that the reactor (Fig. 1B, Fig. 1C) has at least one enclosure (12) of a refractory material made of ceramic material (Col. 11, lines 39-41) of ensuring heat insulation and containing the heat exchange means (3) and internal partitions (11,22), and in that said enclosure is contained in an envelope (outer walls of reactor) containing the reactant or reactants and/or effluents circulating inside said reactor; the internal partitions (11, 22) have recesses (distance Ee) for receiving the heat exchange means (3); and wherein the outside of said enclosure is in direct contact with the inside of said envelope; wherein the outside of said enclosure has a section and dimension substantially equal to that of the inside of said envelope. Regarding claims 13-16, Busson '347 (Col. 1, lines 8-54) and Alagy '016 (Col. 89-17) disclose the reactor can be used in various process of the claimed invention. Note, apparatus claims cover what a device is, not what a device does. See *Hewlett-Packard Co. v. Bausch & Lomb Inc.* 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

2. Claims 1, 3, 6, 10, 13-16, and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Busson et al. (6,027,635). Regarding claims 1, 3, 6, 10, and 21-23 Busson discloses a reactor device (Figure) for carrying out chemical reactions requiring heat exchange (8), said reactor, which is elongate along an axis, having, at a first end (inlet), at least one means (supply lines 1-6) for supplying at least one reactant and, at an opposite end, at least one means (via lines 41-46) for evacuating the effluents formed, and having a plurality of heat exchange means (8) separated by at least one internal partition (impermeable walls) participating in controlling the residence time of the reactant or reactants and increasing the heat exchange surface inside the reactor, and passages (channels) for circulating the reactant or reactants and/or effluents, provided between said heat exchange means and said internal partitions, characterized in that the reactor (Figure) has at least one enclosure (impermeable walls along the housing or envelope) of a refractory material made of ceramic material (Col. 4, lines 1-4) of ensuring heat insulation and containing the heat exchange means (8) and internal partitions (impermeable walls), and in that said enclosure is contained in an envelope (outermost walls of reactor) containing the reactant or reactants and/or effluents circulating inside said reactor; the internal partitions have recesses (channels) for receiving the heat exchange means; wherein the outside of said enclosure is in direct contact with the inside of said envelope; wherein the outside of said enclosure has a section and dimension substantially equal to that of the inside of said envelope; and wherein said enclosure substantially covers all internal walls of said envelope.

Regarding claims 13-16, Busson discloses the reactor can be used in various process of the claimed invention (Col. 1, lines 6-10 and Col. 4, lines 15-20). Note, apparatus

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claims cover what a device is, not what a device does. See *Hewlett-Packard Co. v. Bausch & Lomb Inc.* 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 4-5, 7-9, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busson '635 in view of Grehier et al. (4,612,982). Regarding claims 2 and 4-5, Busson '635 appears to disclose the internal partitions made of modular elements (Figure). For purpose of argument, Grehier teaches the heat transfer plates are stacked into lattices to form a modular structure to allow easy adaptation of different type of fluids (Col. 1, lines 5-9 and Col. 1, lines 40-68). Thus, it would have been obvious in view of Grehier to one having ordinary skill in the art to modify the partition plates of Busson '635 with a modular structure as taught by Grehier in order to allow easy adaptation for operating different type of fluids. The applied references disclose the internal partitions of the claimed invention and it would have been obvious in view of the applied references to one having ordinary skill in the art to provide abutting or non-abutting modular elements since the court held that the use of a one-piece construction versus a single integral piece would be merely a matter of obvious engineering choice.

See *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 19650) and *Schenck v. Norton Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983). Furthermore, Applicants have not disclosed criticality or unexpected results for providing abutting or non-abutting modular elements. Regarding claim 7, it would have been obvious in view of the applied references to one having ordinary skill in the art to change the size and shape the shell (reactor wall) versus the envelope (12) to optimize the reaction zone. In addition, the court held that a change in size and shape is not patentably distinct over the prior art. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955), *In re Rinehart*, 531 F.2d 1048, *In re Dailey*, 357 F.2d 669. Regarding claim 8, it is conventional to provide envelope or reactor wall made of metal and it would have been obvious to do so here to provide metal wall with adequate support to the internal structure and withstand internal vessel pressure. Regarding claim 9, it is conventional to provide anchoring means between the reactor wall and the enclosure 10 or refractory material and it would have been obvious to do so here to facilitate fastening and/or securing the refractory enclosure to the reactor wall or envelope. Regarding claim 11, it is inherent and/or obvious that the fitting of the enclosure 12 against the inside wall reactor prevents or minimizes bypassing of the reactant gases being the fact that refractory material 70 serve as a heat insulating material to minimize heat loss to the exterior of the reactor. Regarding claim 12, Busson '635 appears to show the versatility of the heat exchange construction allowing reaction zone with modification of various length; thus, it inherently and/or obvious that the applied references provide heat exchange means and internal partition with easy access to the internal parts for modification, service and/or repairs.

4. Claims 2, 4-9, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busson '347 or Alagy '016 in view of Grehier et al. (4,612,982). Regarding claims 2 and 4-5, Busson '347 or Alagy appears to disclose the internal partitions made of modular elements (See Alagy '016, Col. 5, lines 13-31). For purpose of argument, Grehier teaches the heat transfer plates are stacked into lattices to form a modular structure to allow easy adaptation of different type of fluids (Col. 1, lines 5-9 and Col. 1, lines 40-68). Thus, it would have been obvious in view of Grehier to one having ordinary skill in the art to modify the partition plates of Busson '347 or Alagy '016 with a modular structure as taught by Grehier in order to allow easy adaptation for operating different type of fluids. The applied references disclose the internal partitions of the claimed invention and it would have been obvious in view of the applied references to one having ordinary skill in the art to provide abutting or non-abutting modular elements since the court held that the use of a one-piece construction versus a single integral piece would be merely a matter of obvious engineering choice. See *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 19650) and *Schenck v. Norton Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983). Furthermore, Applicants have not disclosed criticality or unexpected results for providing abutting or non-abutting modular elements. Regarding claims 6 and 7, Busson '347 and Alagy '016 disclose the various shapes and sizes of the tubes and shell (Busson '347, Col. 5, lines 1-24 and Alagy '016, Col. 10, lines 18-41). It would have been obvious in view of the applied references to one having ordinary skill in the art to change the size and shape the shell (reactor wall) versus the envelope (12) to optimize the reaction zone as evidence by Busson '347, Col. 5, lines 1-47 and Alagy '016, Col. 10, lines 18-41). In addition, the

court held that a change in size and shape is not patentably distinct over the prior art. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955), *In re Rinehart*, 531 F.2d 1048, *In re Dailey*, 357 F.2d 669. Regarding claim 8, it is conventional to provide envelope or reactor wall made of metal and it would have been obvious to do so here to provide metal wall with adequate support to the internal structure and withstand internal vessel pressure. Regarding claim 9, it is conventional to provide anchoring means between the reactor wall and the enclosure 10 or refractory material and it would have been obvious to do so here to facilitate fastening and/or securing the refractory enclosure to the reactor wall or envelope. Regarding claim 11, it is inherent and/or obvious that the fitting of the enclosure 12 against the inside wall reactor prevent or minimize bypassing of the reactant gases (Busson '347 and Alagy '016) being the fact that refractory material 12 serve as a heat insulating material to minimize heat loss to the exterior of the reactor. Regarding claim 12, Busson '347 and Alagy '016 disclose the versatility of the heat exchange construction (Busson '347, Col. 5, lines 58-65) allow reaction zone with modification of various length; thus, it inherently and/or obvious that the applied references provide heat exchange means and internal partition with easy access to the internal parts for modification, service and/or repairs.

Response to Arguments

Applicant's arguments filed 12/16/05 have been fully considered but they are not persuasive. (1) Applicants' argued the "*the projecting portions 12 of Busson et al. '347 provided only two side walls do not surround the heat exchange means and internal partitions on all sides in Busson et al.*" Examiner respectfully disagrees. Busson '347

shows (Fig. 1B) the enclosure (12) containing the heat exchange means (3) and the internal partitions (12) contain the heat exchange means (3) as claimed. Similarly, Alagy discloses the features of the claimed invention with enclosure (refractory material inside the reactor shell 8) and internal partitions 22 containing the heat exchange means (3,4). The enclosure substantially covers or surround all internal walls of said envelope is described in Busson '635.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P. Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong
February 24, 2006

TD


Glenn Caldarola
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